his materials, and a careful selection of examples, Dr. Griffith has rendered his work at once a manual of vegetable and animal anatomy and physiology and a guide to the general classification of organized bodies; and there is no doubt that the student who will take it as a guide, and, in accordance with the author's evident intention, work carefully through the series of easily obtained examples of animal and vegetable structures described in it, will find himself, at the end of his course of study, already in possession of a very considerable amount of information, and quite prepared to follow out any particular line of investigation upon his own account. It is, indeed, manifestly with a view to the latter point that Dr. Griffith has prepared this Text-book, and in this he seems to us to have been eminently successful: we are acquainted with no work so well adapted to set the reader in the way of independent microscopic research. The amount of valuable information compressed into the pages of this little volume is perfectly astonishing, as is also the quantity of beautiful and characteristic coloured figures which the author has succeeded in bringing together in the twelve plates with which the work is illustrated.

To the practical consideration of the microscope itself Dr. Griffith does not devote much space, and he altogether avoids the discussion of the comparative merits of different makers and of different modes of construction, confining himself to a brief description of the essential structure of the instrument and of the uses of its different parts. In his concluding chapter, however, he enters upon the consideration of the scientific principles involved in the construction of the microscope, including the phenomena of refraction and reflexion, the nature and effects of lenses, achromatism, and polarization of light; and we have seldom, if ever, seen these somewhat difficult matters so simply and perspicuously treated.

With regard to the preparation and mounting of microscopic objects, special details are scattered throughout the work, indicating the particular treatment best adapted for the successful preservation of certain groups of objects—the general plans to be adopted in any case being very shortly and simply described in the second chapter. Small as is the space devoted to this important subject, the methods recommended (which indeed are those most commonly in use among microscopists) are thoroughly well described; and perhaps it is better for the beginner to have one good set of methods laid before him, than to be left to select those which may hit his fancy from a collection of all the processes adopted by various microscopists.

MISCELLANEOUS.

Dredgings in the Freshwater Lakes of Norway.

To the Editors of the Annals and Magazine of Natural History.

Gentlemen,—I believe the following extract from Mr. G. O. Sars's account (given in the 'Nyt Magazin,' Christiania, for 1862) of his dredgings in some of the freshwater lakes of Norway has not ap-

peared in English. I send it to you as being likely to interest naturalists in this country.

35 Royal Terrace, Edinburgh.
April 22, 1864.

I am, yours faithfully,
ROBERT B. WATSON.

The dredgings were made in a little freshwater loch in the island of Christiansund, in Norway, by G. O. Sars, son of Professor Sars. The loch is fed from a peat-moss. In the deeper parts of the loch were found great numbers of *Diaptomus Castor*, of a blue colour, along with *Daphnella brachyura*, *Polyphemus Pediculus*, and a species of *Bosmina* (*B. obtusirostris*). Near the shore, among grass and Nymphæas, were *Sida crystallina* and two *Lynceides*, with numerous examples of *Acantholeberis curvirostris*.

He then says that from the deepest part of the loch he got up some of the mud, and adds, "I found this, to my astonishment, full of a small red Copepode, in which I at once recognized the salt-water species *Harpacticus chelifer* described by Lilljeborg. The presence of this Copepode was so unexpected that, in spite of the freshwater forms which I had found, I was obliged to satisfy myself by tasting the water, to be sure it was not brackish. It was perfectly fresh and pleasant to the taste.

"We thus have here, though on a different scale, an interesting analogy to what has quite recently been observed in some of the great inland lakes, such as the Venern and Vettern*, in Sweden,—viz. that true inhabitants of the sea can, in certain circumstances, gradually accustom themselves to live in thoroughly fresh water. Here, however, the ageucy of change has not been great, alterations of physical conditions operating throughout thousands of years. The time in this instance has been much shorter. Apparently some very high flood or a furious storm from the west has driven the sea up on some occasion into the loch, which lies close to the coast. Other salt-water species have probably been carried into the loch at the same time, and perished by degrees as the water lost its saltness, while this little Copepode alone was able to survive after every trace of salt had disappeared. It is also interesting to observe the influence which its residence in a foreign medium has had on its mode of life. While, in ordinary circumstances, it is almost exclusively to be found in the very shallowest pools, I found it here, as I have said, in the deepest part of the water, sunk in the mud; and the same is the case with many of the salt-water forms found in the inland lakes of Sweden (such as *Idothea entomon*, *Gammarus loricatus*, *Pontoporeia affinis*). This fact seems to indicate a certain tendency in these forms, when cut off from their proper habitat, to keep themselves isolated from the true freshwater Crustaceans."

Further on, in dredging the Mjösen Lake, oue of the very largest in Norway, through which flows an immense river, he says:—

"But my most interesting discovery here was a Crustacean which

* See Lovén, on certain Crustaceans found in the Lakes Venern and Vettern, 'Öfversigt af Vetenskabens Akademiens Förhandlingar' for 1861.

belongs exclusively to the salt water, *Mysis relicta* of Lovén, one of those extraordinary relics of the glacial period whose presence in some of the great inland lakes of Sweden has lately excited so much interest. I found it in small numbers at Stigersand, below Skreifjeld, in from 8–10 fathoms, just in the corner where a sandbank slopes steeply up from the deeper water beyond.

"Associated with it, I found numerous examples of a species of *Gammarus* which at the very first glance differed markedly from the form I had previously noticed, and which seems to be the *Gammarus cancelloides* of Gerstfeldt, which was first discovered in the Seas of Baikal and of Angara, and which has lately been also found in Sweden, and which Lovén likewise considers originally to have belonged to the sea."

On the Expulsion of the Carbonic Acid from the Blood during Respiration. By Dr. Ludwig.

As less carbonic acid is present in arterial than in venous blood, the elimination of this carbonic acid during respiration must be ascribed either to the oxygen or to the tissue of the lungs. For the decision of this question a series of experiments was undertaken, in which this gas was collected from unaltered venous blood, and also from venous blood which had been agitated with air containing oxygen. The blood agitated with oxygen was found to have lost its carbonic acid to such an extent that its amount of this gas was only equal to that contained in arterial blood. There is consequently no reason for regarding the pulmonary tissue as the cause of the evolution of carbonic acid.

When the unaltered venous blood was left for twenty-four hours in ice-cold water and then analyzed, it appeared that in this case also the amount of carbonic acid was diminished. The same process therefore takes place in blood poor in oxygen as in that which contains oxygen in abundance, but with this difference, that what takes place very completely and in a short time in blood rich in oxygen is effected very gradually in that which is poor in that element.

To determine whether the evolution of carbonic acid is effected directly by the oxygen, or only by the intervention of the blood-corpuscles, the purest possible serum, which, as is well known, contains much carbonic acid, was employed—and, for the sake of comparison, both unaltered serum and such as had been agitated with oxygen. In these experiments the same quantity of combined carbonic acid was found in every case, and consequently only that portion of the oxygen which has passed into the corpuscles acts in the evolution of carbonic acid.

As arterial blood may thus be prepared artificially from venous blood, it was natural to try whether the reverse of this process could be effected. This, however, appears to be impossible. For when the oxygen was pumped out of arterial blood and replaced by a quantity of carbonic acid equal to that which usually occurs in venous blood, the amount of combined carbonic acid in the blood could not be increased. Hence it follows that carbonic acid is furnished in the